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# Comparing clinical requirements for oral and maxillofacial surgery among undergraduate Saudi dental colleges

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## ABSTRACT

**Aim:** This study aims to evaluate the current status of the Saudi undergraduate training in Oral and Maxillofacial Surgery in Saudi dental colleges, through comparing the clinical requirements performed by the undergraduate dental students. **Methodology:** Observational cross-sectional study was conducted through survey based structured interviews; developed and validated by the research team. Each interview was conducted through two calibrated interviewers to minimize human error. The interviews were a minimum of one to three students meeting the selection criteria. The question matrix inquired about teaching methods, students-staff ratio, requirements, and competency exams. **Results:** Descriptive statistical analysis was used to present the data in tables and graphs. Significant differences were observed in requirements and competency exams. Out of the 25 dental schools, 20 have responded with a sample size of 110 participants. 8 out of the 20 schools adopted comprehensive care clinics. The clinical hours ranged from 3 to 12 hours per week. Only 1 college exceeded the accepted student- staff ratio which was more than 20 students per one faculty. Requirements varied significantly; some schools required a minimum of 1 extraction while others required 20 extractions per year. Moreover, surgical extraction requirements were only mandatory in 5 colleges with the range of 1 to 7 surgical extractions. Competency exams were not required in 2 dental colleges. **Conclusion:** There are significant differences in the clinic type, requirements, and assessment tools among colleges that might influence the graduates' competence and experience level. Moreover, this might introduce bias between graduates of different colleges.

**Keywords:** Dental education, Oral and maxillofacial surgery, Undergraduate curriculum, Dental clinical training



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## 1. INTRODUCTION

Comprehensive patient care is the backbone of the undergraduate dental clinical training in the field of Oral and Maxillofacial Surgery (OMFS) in all dental colleges, in the Kingdom of Saudi (Al-Dajani, 2015). The integrated OMFS curriculum includes both didactic and clinical training in the following aspects: dento-alveolar surgery, head and neck anatomy, oral pathology, management of the medically compromised individuals, administration of local anesthesia, and pain control (ADEA House of Delegates, 2008). All of which is to prepare undergraduate dental students to become competent general dentists who can examine, diagnose, surgically treat, and manage diseases in the oral and maxillofacial region (Halawany, 2014). Furthermore, skills acquired during undergraduate education include local anesthetic techniques, dental extractions, and minor oral surgeries (Halawany, 2014; Maccluskey et al., 2008). This report was done with the aim of determining the structure, mode of delivery, assessment methods, and staffing of the oral surgery undergraduate curriculum within Saudi dental schools.

## 2. MATERIAL AND METHODS

A fixed set of predetermined questions survey was created using Excel-2016. The survey was detailed, containing questions about descriptive information of each school, type of clinics (comprehensive clinics or disciplinary-based clinics), minimum number of requirements, students-available faculty ratio, assessment methods, and availability of clinical competency exams. The question matrix went through content validation through an online meeting (via Zoom) with four dental instructors who are experts in dental education, to ensure that all important aspects regarding the clinical assessment and the level of competence are covered. An interview, prior to carrying out the research interviews, was done on a few colleagues, who are not participating in the research, to ensure that the designed matrix of questions produced enough relevant data to answer the research question. Furthermore, to evaluate if there is a further need to refine the matrix before conducting the interviews. A pilot interview was done on 10% of the sample size, comprising of 6 students from one dental college.

Ethical approval was gained from the King Abdullah International Medical Research Center Ethics Committee (ethical approval code/IRB:RYD-20-419812-154616). It was made clear to participants that the information provided would be treated confidentially and used to form this report. A list of dental colleges was compiled, using a list from the Saudi Commission for Health (Specialists). The list contained twenty-eight dental colleges, three of which were excluded because they have not had graduates yet. A sample size of 156 dental students was selected (six from each university to eliminate recall bias). The inclusion criteria for the participant to be part of the focus group was as follow: currently registered students in the relevant academic year, among the top 30% of the batch, familiar with the requirements in their colleges, have read the course books, syllabus description of the related subjects, and did not take a year off during the clinical stage. For an appropriate participants' selection, a convenient sampling method was used. Students enrolled in twenty-five Saudi colleges were contacted through social networking and asked if they would participate in the research.

Furthermore, only students enrolled in twenty dental schools responded and agreed to participate. A total of 120 dental students were selected, six dental students from each dental college. In addition, due to the limited number of students who were willing to participate in the study, one to two students were interviewed. After the initial emails were sent and signed consent forms were obtained, interviews were conducted by two interviewers to reduce human errors or miscommunication incidents. The application that was used to do the interviews was Zooming. Moreover, the interview sessions were recorded using Zoom Software. This was used for data entry (through Excel-2016). Descriptive statistics were used to describe and summarize the characteristics of the undergraduate clinical training at each Saudi dental college, and included calculating means, percentages and their corresponding standard deviations as indicated. All data was treated with confidentiality and saved in an encrypted hard desk. Moreover, all dental colleges were given an alphabetic code, which represents the colleges to compare between them while maintaining their anonymity. Finally, descriptive analysis of the data was performed using Microsoft Excel and Word. The study duration was 8 months (July 2020- February 2021).

## 3. RESULT

### Clinical Hours

The average clinical hours per week in Saudi undergraduate dental colleges ranged from 5-12 hours. Out of the 20 undergraduate dental colleges, 8 colleges follow the comprehensive care system are shown in Figure 1. Moreover, only 2 colleges have oral surgery as a separate course, and 10 colleges follow a different approach, in which the oral surgery requirements are involved under two courses, the comprehensive care course and oral surgery course. The clinical hours for colleges that adopted comprehensive care system ranged from 3-12 hours per week while colleges that had a combined approach ranged from 1-5 clinical hours per week.

Moreover, clinical hours of colleges have oral surgery as a separate course ranged from 2-4 hours per week. Comprehensive care system has the highest clinical hours because it involves different specialties other than oral surgery unlike the separate course system, where the clinical hours are specified only for oral surgery (figure 2 & 3).

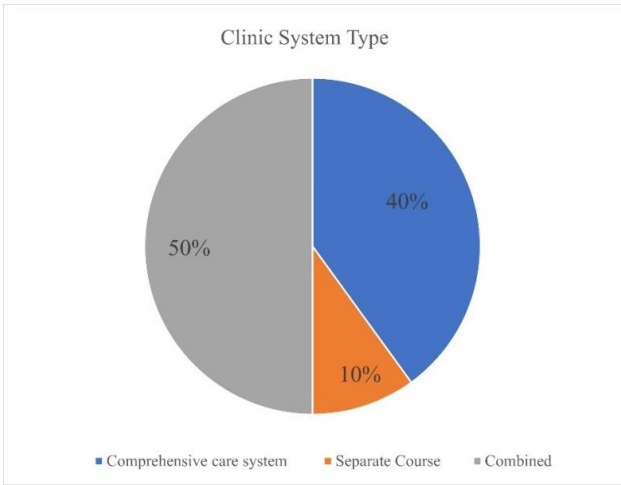


Figure 1 Number of schools following different clinical systems.

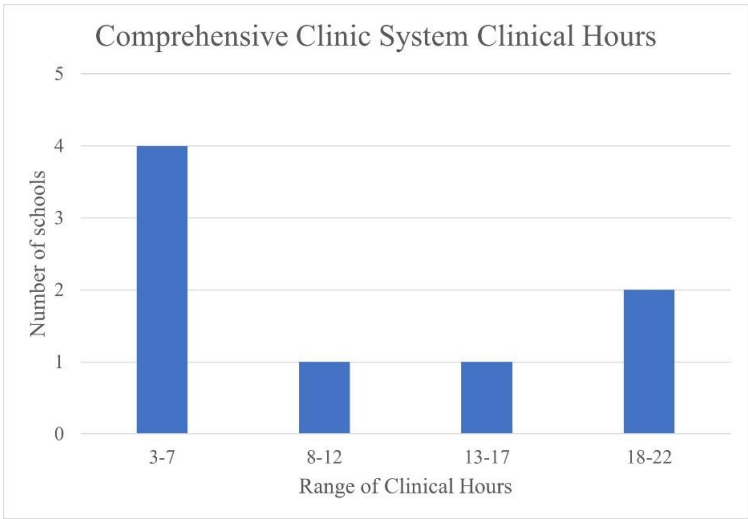


Figure 2 Clinical hours range of comprehensive clinical system.

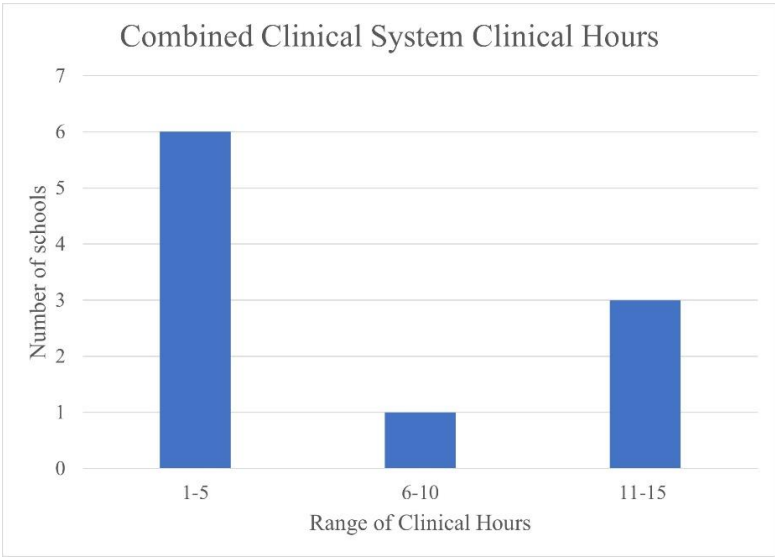


Figure 3 Clinical hours range of combined clinical system.

### Clinical requirements

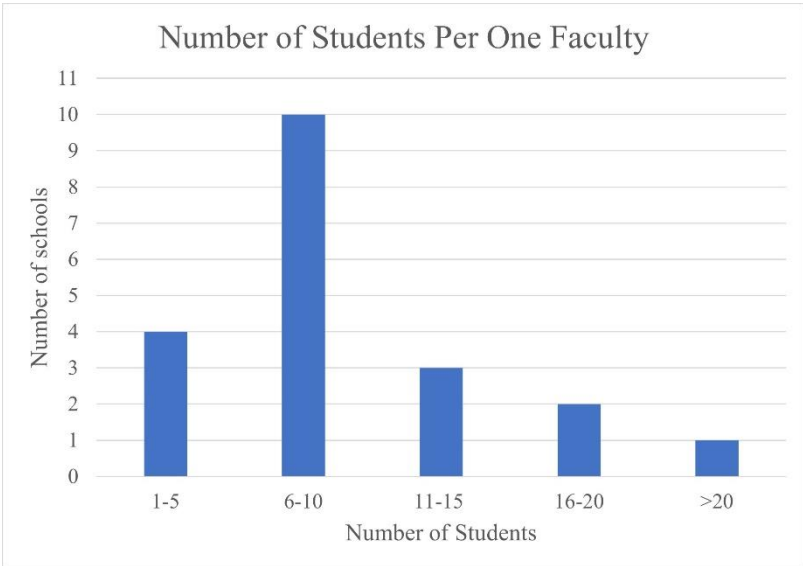
OMFS requirements for all dental schools were focused more on forceps extraction. 3 schools used point system to calculate the requirements of forceps extraction instead of specifying number of teeth. Table 1 demonstrates the minimum number of forceps and surgical extractions, which shows all schools required forceps extraction while surgical extraction was required in 5 out of 20 dental schools. The average number of forceps extraction was 20 teeth for each undergraduate student in Saudi Arabia. On the other hand, the ranges of surgical extractions operated by students were between 1-7 extractions. The assessment methods of extraction for each student were based on the ability to achieve successful anesthesia, knowledge of each instrument and its use, atraumatic extraction technique, and providing the proper post-operative instructions.

**Table 1** Minimum number of forceps/surgical extractions for undergraduate program in Saudi Arabia

Dental schools	Minimum number of forceps extraction	Minimum number of surgical extraction
A	Point system	0
B	Point system	0
C	Point system	0
D	25	1
E	14	0
F	13	0
G	10	0
H	22	0
I	No data	
J	No data	
K	No data	
L	40	0
M	34	0
N	13	1
O	13	6
P	4	0
Q	25	0
R	20	0
S	22	0
T	17	0
U	20	0
V	28	6
W	22	0
X	No data	
Y	No data	

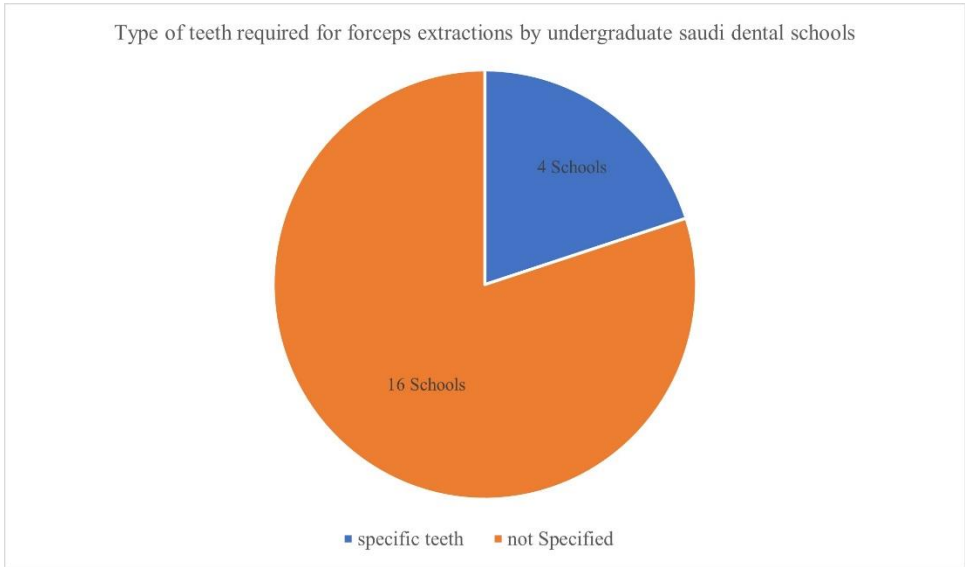
### Students: Staff Ratio

Figure 4 represents the number of students assigned to 1 faculty among all Saudi dental colleges. Most colleges allocate 6-10 students per 1 faculty. Moreover, only 1 college assigned oral surgeon to supervise all the students, in case any of the patients required an extraction or any related oral surgery intervention.



**Figure 4** number of students supervised by one oral surgeon.

Figure 5 shows the majority of dental schools did not require specific teeth while 4 schools specified multi-rooted/ mandibular teeth since their extraction required higher skills in terms of anesthetizing the inferior alveolar nerve (IAN) and extracting the teeth atraumatically.



**Figure 5** Number of schools that required specific type of teeth for undergraduate Saudi dental program.

In table 2, some schools adopted other methods of teaching surgical extractions such as observation or assisting an oral surgeon. Observation was mandatory in 3 schools with a range of 2-12 observations. Moreover, 7 schools required their students to assist a surgical extraction with the minimum required sessions ranging from 1-15. Other oral surgery requirements and procedures were demanded for students include suturing, which was done in 3 schools. Moreover, performing a biopsy procedure was an optional requirement in 1 school.

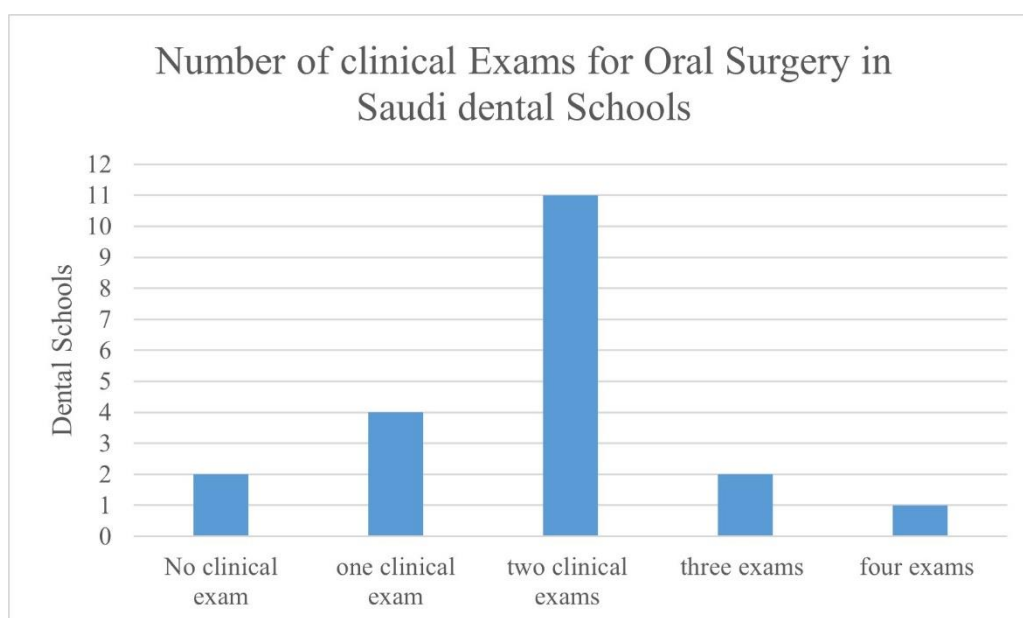
**Table 2** Minimum number of observation/assistants on surgical extractions for undergraduate program in Saudi Arabia

Dental schools	Minimum number of observing surgical extraction	Minimum number of assisting surgical extraction
A	0	15
B	0	2

C	0	0
D	12	3
E	0	0
F	0	0
G	0	0
H	0	1
I	No data	
J	No data	
K	No data	
L	0	0
M	0	3
N	2	0
O	0	0
P	0	0
Q	0	0
R	0	0
S	0	0
T	0	5
U	2	0
V	0	0
W	0	3
X	No data	
Y	No data	

### Clinical competency

Out of the 20 dental schools, 18 schools required their students to perform an extraction as a clinical exam. According to figure 6, the number of clinical competency exams varied; however, the majority of dental schools required 2 procedures whereas 2 dental schools did not require their student's to perform any clinical procedure as a competency exam. 5 schools required specific criteria for the competency clinical exam. The selected criteria included the extraction of at least 1 multirrooted tooth. Moreover, 1 school required 1 forceps extraction for a single rooted tooth. 2 out of the 18 schools, that have clinical exams, required their students to perform 1 simple surgical extraction as a clinical competency exam.



**Figure 6** Number of clinical exams for Oral surgery in the last two clinical years in Saudi dental schools.

#### 4. DISCUSSION

This interview-based survey allowed for assessment and comparison between different undergraduate dental clinical training programs adopted by different Saudi dental colleges. In terms of the utilized clinic type (comprehensive or disciplinary based), 8 colleges utilized comprehensive-based clinics with an average of 3-12 clinical hours per week. 2 other colleges delivered the OMFS clinical training via a disciplinary-based approach, with an average of 2-4 hours per week. The higher number of clinical hours in schools following a comprehensive care approach does not suggest that students are practicing OMFS procedures solely; as the comprehensive care approach involves practicing other dental specialties as well. While on the other hand, schools dedicating less hours per week to solely practice OMFS procedures; may have more effective and adequate training for students, as such approach ensures more exposure to variant cases and more practice. As for the remaining 10 dental schools, they followed a different approach of combining both systems with an average of 1-5 clinical hours.

10 Saudi dental colleges' allocated 6-10 students per 1 faculty while 4 other colleges, assigned 1-5 students to 1 faculty. According to Macluskey et al., (2008), allocating 4-8 students per 1 faculty for clinical supervision is reasonable to help students gain basic skills and become relatively independent practitioners. However, the previous ratio, 4-8 students per faculty, may be a burden on the involved teaching staff since students usually require more supervision at the beginning of their clinical exposure (Macluskey & Durham, 2009). Nevertheless, 6 colleges allocated 11 to 20 students per 1 faculty only to supervise students who encounter difficult cases.

Forceps exodontia is the most practiced OMFS procedure during the undergraduate clinical training. Moreover, forceps extraction was the only mandatory requirement, where some colleges required a maximum of 40 extractions from each student. This gave students the experience and the confidence to provide primary care to patients. Furthermore, it enabled them to develop the management skills necessary for modern practice. On the other hand, 4 colleges required their students to specifically extract multi-rooted/mandibular teeth because it necessitated greater skill in anesthetizing the IAN and extracting the tooth. The clinical requirements of oral surgery curriculum were compared in all dental institutions in the United Kingdom (UK) (Macluskey & Durham, 2009). The average number of forceps extractions in UK dental schools was 51 teeth, while in Saudi Arabia it was almost 20 teeth (Macluskey & Durham, 2009). Nonetheless, the variation of surgical extractions in Saudi dental schools was dramatic. 5 schools required their students to perform surgical extractions. However, 3 of which required more than 1 surgical extraction per student. Surgical extractions had a mean number of 6 teeth in the UK wherein Saudi Arabia, the mean number was 4 teeth (Macluskey & Durham, 2009). 8 colleges had acquired other approaches in teaching surgical extraction. For instance, observation and/or assisting an oral surgeon to aid students assess the difficulty of the cases. 34% of the dental surgery in UK referrals had been considered inappropriate as the rationale for the referrals were competence or confidence of the referring practitioner (Oliver et al., 2016). Furthermore, 28% of UK recent graduates felt that their undergraduate surgical extraction training was inadequate (Oliver et al., 2016). All in all, the main reason for the discrepancies of oral surgery requirements in Saudi Arabia was the scarce availability of patients and the adding treatment fees as another obstacle faced by students in private schools.

Clinical competency exams were a widely used assessment method by the majority of dental schools. 2 dental colleges did not require their students to perform a competency exam, where the other colleges required their students to perform 1 or 2 clinical competency exams. As a minimum of 1 multirrooted tooth, 5 dental colleges utilized these criteria for clinical competency exam. In contrast, 2 dental colleges obligated their students to preform competency exam on 1 simple surgical extraction. Moreover, 1 college counted one forceps extraction for a single rooted tooth as competency exam. Students usually display high confidence in competency exam while performing simple clinical procedures, while they were relatively less confident in performing complex procedures (Al-Dajani, 2015). Thus, the significant improvement in students' confidence can be correlated to the procedure and their interaction with patients combined with direct supervision by knowledgeable faculty members (Al-Dajani, 2015). In addition, students perceive themselves to be more competent in procedures they perform more frequently.

The limitation of our study was mainly reaching the undergraduate dental students in their last two clinical years in the 25 Saudi dental colleges. Thus, 5 dental colleges did not participate in this study, for the lack of participants. The criteria for conducting the interviews implied the presence of a group of three students enrolled in each of the last two clinical years; to eliminate the recall bias. However, in some schools, one to two students were interviewed due to the limited number of students who were willing to participate in the study. Many schools adopted point system curriculum rather than a requirement-based curriculum. Therefore, adequate interpretation of data relating to the clinical requirements, obtained from schools that adopted the point system for each dental procedure, was not feasible. For instance, while a single-root tooth extraction was equivalent to 10 points in some schools, it was equivalent to 100 points in others.



## 5. CONCLUSION

This quantitative study sheds light on clinical hours, student-staff ratio, clinical requirements, and clinical competency exams in Saudi oral surgery undergraduate courses. There were meeting points between most of the dental colleges in regards to oral surgery undergraduate requirements. However, there is a great gap in the amount of surgical extraction required as only 5 colleges out of 20 demanded surgical extractions done by undergraduate students. On the other hand, other colleges just require students to observe or assist in surgical extractions. In regards to forceps extraction, 4 colleges specified the type of tooth to be extracted. Moreover, many variations were found in respect to clinical competency exams amongst Saudi oral surgery courses. Standardization of the Saudi oral surgery courses and assessment methods is recommended.

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### Authors Contribution

Reem Almalki: Idea of the Study, Consent Forms Writing, Question Matrix Development, Sample Size Collection, Validation, Data Collection, Interviews, Analysis, Writing (Introduction and Methodology sections)

Reem Al Oboud: Sample Size Collection, Validation, Data Collection, Interviews, Analysis, Writing (Result section and Figures)

GhaidaAljammaz: Sample Size Collection, Validation, Data Collection, Interviews, Analysis, Writing (Result section and Figures)

Sondus Baghdadi: Sample Size Collection, Validation, Data Collection, Interviews, Analysis, Writing (Abstract and Conclusion sections)

Hadeel Albarkheel: Sample Size Collection, Validation, Data Collection, Interviews, Analysis, Writing (Discussion section)

Mohammad Awawdeh: Conceptualization, Supervision, Project Administration, Validation

### Conference presentation

6<sup>th</sup> International Conference of the Saudi Society of Oral and Maxillofacial Surgery.

### Funding

This study has not received any external funding.

### Conflict of Interest

The authors declare that there are no conflicts of interests.

### Data and materials availability

All data associated with this study are present in the paper.

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